

Seamless Care: Safe Patient Transitions from Hospital to Home

Andrea M. Spehar, Robert R. Campbell, Carron Cherrie, Polly Palacios, Donna Scott, Jacquelyn L. Baker, Brad Bjornstad, Jay Wolfson

Abstract

Background: “Seamless care” is a smooth and safe transition of a patient from the hospital to the home. Our goal was to identify ways to maximize improvement in postdischarge patient outcomes. This research targeted patients at risk for unscheduled readmissions, examined delivery system processes, and identified possible interventions for providing more seamless care. **Methods:** This pilot study included three phases. In the first phase, we examined selected readmissions using extant administrative databases for fiscal year 2001 at two facilities, a Department of Veterans Affairs (VA) hospital and a private, nonprofit hospital. We identified patient characteristics that were associated with a high risk of unscheduled readmission within 30 days of discharge for three Diagnosis Related Groups (DRGs) (127–Heart Failure, 89–Pneumonia (> 17 years), and 109–Coronary Artery Bypass Graft without catheterization). Survival analyses and other statistical techniques were used. An expert panel focus group provided insights into discharge planning processes. Finally, patients in these DRGs at the two hospitals who were discharged and had an unscheduled readmission within 30 days were interviewed to obtain their perceptions of factors that might have contributed to their readmissions. **Results:** Factors associated with readmissions varied by DRG. Numbers of secondary diagnoses, length of stay, and Clinical Classification Software (CCS) category were the most consistent predictors of readmission. Age, gender, and race were not predictive. Qualitative analysis identified several themes that centered on communication issues between patients and providers, providers and caregivers, and between different providers. Patients’ perceptions of what might have prevented readmission included longer hospital stay to ensure stabilization, enhanced patient education and involvement in the decisionmaking process, increased assurance of medication/treatment effectiveness prior to discharge, home health nursing, increased staffing, and timeliness of followup appointments. **Conclusions:** Despite very different organizational structures and processes, we found similar patient populations, risk factors, and outcomes in the two hospitals. The linkages in these different health care facilities between readmissions and health system barriers to safe and smooth transitional care confirm findings in other studies. Patient and organizational factors each contributed to unscheduled readmissions. High-risk patient targeting, improved communications (including a greater emphasis on language barriers and cultural differences), and better coordination of care and followup could potentially prevent some readmissions when transitioning patients from the hospital to the home.

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Introduction

Patients face a significant risk of adverse events during the transition from the hospital to the home.^{1,2} Processes at the patient and organizational levels have been identified as potential risk factors that can facilitate or impede safe patient transitions.³

Health care is a complex, fragmented, and discontinuous system that provides opportunities for systemic failure and can adversely affect patient safety. Errors often occur during the transitional phase of any system, and one strategy for reducing errors associated with transitions is the advancement of seamless care, defined as a smooth and safe transition of a patient from the hospital to home setting. Continuity of care is most critical during the patient's transition from the institutional acute care setting to the community; however, the reality often is the antithesis of the seamless care concept.⁴⁻⁷ Good communication between patients, caregivers, and providers and a comprehensive transitional care plan are crucial for successful medical management during this period.⁸⁻¹⁴

As our aging patients are discharged “quicker and sicker,” those with recent hospitalizations are almost surely more vulnerable to errors and misadventures than are those in the general population with the same diseases.^{15,16} In addition to assisted living and skilled nursing facilities, homes are fast becoming care centers themselves as new technology allows us to monitor and administer treatments once confined to the inpatient hospital setting.¹⁷⁻¹⁹ Patients are now expected to accept greater responsibility for therapy adherence and their own safety. Health care providers are segregated and geographically removed from the patient's home setting and are often forced to rely on poor communication and coordination techniques between themselves and their distant patients. Home health care services can bridge this gap, but may be underutilized or unavailable.²⁰⁻²⁶

In this pilot project, we examined processes at the patient and organizational levels to identify factors that facilitate or impede seamless care during this critical period of transition. Our objective was to identify ways to maximize improvement in postdischarge patient outcomes. This pilot research project targeted patients at risk for unscheduled readmissions within 30 days of their original hospital discharge. Additionally, it examined patient and organizational factors contributing to such discharges, and sought to identify possible interventions for providing a more seamless transition of care.

Methods

This study involved two geographically proximal (**less than a mile apart**) but distinctive hospitals. The Tampa Veterans Affairs (VA) Hospital is a 327-bed tertiary care teaching hospital that also includes a nursing home care facility. A full range of inpatient and outpatient care is provided for veterans, including medical, surgical, psychiatric, and neurological services, as well as a spinal cord injury service, comprehensive rehabilitation therapy, and nursing home care. A

computerized patient record system (CPRS) and a computerized pharmacy order entry (CPOE) system enable providers to access inpatient and outpatient medical and pharmacy records. Discharge planning and case management at this hospital are organized by service.

University Community Hospital (UCH) is a 431-bed, private, not-for-profit hospital that provides mainly acute care. It contains six centers of excellence focused on major disease areas, including cancer treatment, cardiac care, women's health, pediatrics, diabetes management, and orthopedics. A computerized medical records system is presently being implemented at UCH, but the system was not functional at the time of this study. UCH also has a centralized, integrated Case Management department that coordinates discharge planning for the entire hospital.

We received human subject protection approval for all phases of this study from each of the Tampa VA Hospital and UCH approval boards.

Phase I—retrospective data

Unscheduled readmission within 30 days of discharge was chosen as an indicator of a potential adverse outcome because unscheduled readmissions within 30 or 31 days of discharge are a commonly accepted acute care quality indicator^{27–32} and are readily available in administrative databases. Extant administrative databases for fiscal year (FY) 2001 were used to conduct preliminary analyses in each facility for the top 20 Diagnosis Related Groups (DRGs) by total admissions, as well as readmissions within 30 days, percentages, and associated costs. Using these data, we then selected three DRGs as high-risk groups for our initial focus. The three targeted DRG categories were: 127—Heart Failure (HF), 089—Pneumonia (>17 years), and 109—Coronary Artery Bypass Graft (CABG) without catheterization. These categories reflect national areas of quality improvement focus.^{27–31}

Data analyses included exploratory descriptive statistics and survival analysis. All FY 2001 discharges were included for patients at both hospitals, provided they had at least one discharge with DRG categories 109, 127, or 89. Based on a review of the literature, data availability, and input from the team's clinician researchers, the variables examined for each of these patients were age, gender, race, discharge site, length of stay (LOS), primary admitting diagnosis, All Patient Refined Diagnosis Related Groups (APR-DRG™) severity score, and secondary diagnoses. The VA hospital, however, did not possess the APR-DRG Software for severity scoring.³³ We received a research license from 3M to use the stand-alone version of their APR-DRG software, so that we might compare data between the hospitals and take illness severity into consideration as a possible predictor of readmission. We also analyzed direct medical costs using the hospitals' Decision Support Systems (DSS).

Descriptive statistics

Data for patients in each of the three DRG categories were examined independently using contingency tables. Variables for readmitted and non-readmitted patients were compared using two-tailed independent sample *t*-tests, chi-square tests, and where appropriate, Fisher's Exact tests. The Modified Bonferroni correction was used to control for multiple comparisons. We analyzed the data between hospitals and between patients with 30-day readmissions and for those who were not readmitted, using SAS for Windows,[®] version 8.02.³⁴

Survival analysis

The Anderson-Gill extension of the Cox Proportional Hazard Analysis was used to analyze the data using Insightful S-Plus version 6.0.^{® 35, 36} This method enabled us to estimate the risk of readmission through the use of several explanatory variables and permitted us to account for multiple readmissions per patient across time. Each DRG category was examined independently.

The survival analysis was modeled two ways: (1) all readmissions, and (2) 30-day readmissions. Data for patients were not analyzed if they were discharged against medical advice or if the patient died during the first admission. When the patient died but had prior admissions during the study period, only the data from the final admission was deleted.

Clinical Classification Software (CCS) developed by the Agency for Healthcare Research and Quality (AHRQ) was used to aggregate the ICD-9-CM codes into homogenous diagnosis groups for the purposes of modeling readmissions by disease groupings. The final model consisted solely of the significant explanatory variables. Due to data limitations, it was necessary to collapse the following into dichotomous variables for the purposes of analysis: race (white versus nonwhite), discharge site (home versus other), and CCS/ICD-9-CM into two-level factors. Secondary diagnoses were transformed from ICD-9-CM codes to the number of secondary diagnoses.

Phase II—expert panel

An expert panel focus group was convened, consisting of representative hospital staff and administrators from the two hospitals, plus the University of South Florida (USF) Health Sciences Center faculty, the Florida A&M College of Pharmacy faculty, and health services researchers from the Suncoast Center for Patient Safety. Represented disciplines included nursing, medicine, public health, case management, pharmacy, database management, and social work. The focus group was convened to obtain core information regarding the participants' perceptions and experience of patient transitions from acute care to home/community care settings. Five women and four men participated in the focus group. Qualitative researchers performed content analysis on tapes and transcripts of the discussion. The main themes, points, problems, and questions that arose during the focus group were summarized.

The results of Phases I and II aided in planning Phase III of the study, a focused interview and limited medical records review of selected patients who had been hospitalized at one of the two hospitals for one of the three DRG categories of interest, and were readmitted within a 30-day period following discharge.

Phase III—patient interviews

A patient safety study group developed the patient interview guide, which included six open-ended questions addressing the reason for readmission to the hospital, the patient's perception of readiness for discharge, medications and other home-care management instructions, satisfaction with inpatient care, and outpatient followup. In addition, probe questions were used to elicit relevant information and guide the interview. Those conducting the interviews also collected demographic information from the patients.

Interviewers received training in qualitative interviewing techniques as well as human subject protection prior to beginning the patient interviews. Eligible patients at the two hospitals were identified using administrative datasets. Patients selected for the interviews had been readmitted to the hospital within 30 days of their original discharge, and their previous admission involved one of the three DRG categories of interest. Eligible patients readmitted for any reason following their discharge from either hospital were approached by participating licensed clinical social workers (Tampa VA) or case managers (UCH), and were asked if they would be willing to participate in this study. Informed consent was obtained from those who agreed, after which they were interviewed. A total of 25 patients were interviewed—15 patients at the VA hospital and 10 patients at the community hospital. The person interviewing the consented patients took notes on the patients' responses and asked the patients' permission to audiotape the interviews.

The interviews were tape-recorded, transcribed, and coded using NVivo™ qualitative data analysis software, version 1.2142.³⁷ The first level of content analysis included a review and open coding of the interview transcripts and notes. A second-level coding then was done to develop categories by like topics. Nine major categories were used to summarize the results, and direct quotes were used for illustrative purposes.

Results

Phase I—retrospective data analyses

Table 1 summarizes patient characteristics by facility and DRG category. There were a total of 1,845 patients, with each patient having an average 2.01 admissions during FY 2001.

Table 1. Patient characteristics by facility and DRG

	DRG 109 (CABG)				DRG 127 (HF)				DRG 89 (Pneumonia)			
	VHA		UCH		VHA		UCH		VHA		UCH	
	n	%	n	%	n	%	n	%	n	%	n	%
Discharges ^a	249		208		446		1308		716		783	
Unique patients	151		143		248		660		185		458	
Ave discharg/pt	1.65		1.47		1.80		1.98		3.87		1.71	
Gender ^b												
Male	149	98.7	109	76.2	189	97.4	270	40.9	164	95.9	204	44.5
Female	2	1.3	34	23.8	5	2.6	390	59.1	7	4.1	254	55.5
Race/ethnicity ^b												
White	132	95.0	135	94.4	153	80.5	468	81.5	143	87.2	396	86.5
Black	2	1.4	2	1.4	24	12.6	96	16.7	12	7.3	52	11.4
Hispanic	5	3.6	0	0.0	13	6.8	0	0.0	8	4.9	0	0.0
Other	0	0.0	6	4.2	0	0.0	10	1.7	1	0.6	10	2.2
Age ^c	64.6	8.5	66.2	10.1	70.1	11.1	73.2	14.3	69.1	11.1	67.8	18.6
Severity ^d												
Minor	47	31.1	13	9.1	20	9.0	34	4.7	6	3.3	15	3.2
Moderate	82	54.3	66	46.2	145	65.6	372	51.2	108	59.7	214	45.8
Major	15	9.9	48	33.6	51	23.1	267	36.7	59	32.6	195	41.8
Extreme	7	4.6	16	11.2	5	2.3	54	7.4	8	4.4	43	9.2
Discharge site ^b												
Community	146	96.7	101	70.6	194	87.4	443	60.9	140	77.3	273	58.5
Nursing home	1	0.7	8	5.6	15	6.8	114	15.7	25	13.8	102	21.8
Other	1	0.7	27	18.9	0	0.0	121	16.6	0	0.0	76	16.3
Irregular	1	0.7	0	0.0	2	0.9	0	0.0	4	2.2	1	0.2
Died	2	1.3	7	4.9	11	5.0	49	6.7	12	6.6	15	3.2
LOS ^c	10.0	6.6	8.4	4.4	5.4	4.8	5.3	4.1	6.3	6.5	6.1	4.2
30-day readmission rate ^{e,f}		14.5		6.6		25.6		25.1		19.5		13.6

^a Tampa VA total number admissions was 9,332 in FY 2001; UCH total number admissions was 25,909 in FY 2001.

^b Significant difference at alpha \leq 0.05 level, adjusted for multiple comparisons for all DRGs.

^c Mean and standard deviation reported.

^d Significant difference at alpha \leq 0.05 level, adjusted for multiple comparisons for DRGs 109 and 127.

^e Calculated by # of visits with 30 day readmits/total stays per DRG (excluding deaths) x 100.

^f Significant difference at alpha \leq 0.05 level, adjusted for multiple comparisons for all DRG 109.

Table 2 is a comparison of readmitted and non-readmitted patients, by DRG category. Due to the complexity of the data, these numbers account for only the first visit in a readmission series (i.e., if an initial visit led to multiple readmissions during the 30 days following the original discharge, it was counted only once).

Table 2. Comparison of readmitted and non-readmitted patients by DRG

	DRG 109 (CABG)				DRG 127 (HF)				DRG 89 (Pneumonia)			
	VHA		UCH		VHA		UCH		VHA		UCH	
	n	%	n	%	n	%	n	%	n	%	n	%
Hospital												
VHA	21	72.4	130	49.1	36	26.5	158	78.0	24	32.0	147	26.5
UCH	8	27.6	135	50.9	100	73.5	560	22.0	51	68.0	407	73.5
Sex												
Male	35	97.2	230	86.8	86	63.2	373	51.9	45	60.0	323	58.3
Female	1	2.8	35	13.2	50	36.8	345	48.1	30	40.0	231	41.7
Race/ethnicity ^a												
White	29	100.0	238	94.1	114	84.4	507	80.6	65	86.7	474	86.7
Black	0	0.0	4	1.6	15	11.1	105	16.7	9	12.0	55	10.1
Hispanic	0	0.0	5	2.0	4	3.0	9	1.4	0	0.0	8	1.5
Other	0	0.0	6	2.4	2	1.5	8	1.3	1	1.3	10	1.8
Age ^b	65.2	9.4	66.7	8.3	71.4	14.0	73.3	12.3	68.2	17.1	67.6	15.5
Severity ^c												
Minor	4	9.5	56	22.0	4	2.4	50	8.6	2	2.5	19	3.4
Moderate	17	40.4	131	51.4	99	58.9	218	37.6	34	42.0	288	50.8
Major	3	7.1	60	23.5	57	33.9	261	45.0	35	43.2	219	38.6
Extreme	18	42.9	8	3.1	8	4.8	51	8.8	10	12.3	41	7.2
Discharge site ^a												
Community	25	86.2	222	83.8	120	71.4	517	66.2	48	59.3	365	64.4
Nursing home	2	6.9	7	2.6	28	16.7	101	12.9	19	23.5	108	19.0
Other	2	6.9	26	9.8	19	11.3	102	13.1	13	16.0	63	11.1
Irregular	0	0.0	1	0.4	1	0.6	1	0.1	1	1.2	4	0.7
LOS ^b	11.0	6.01	9.0	5.6	6.08	5.0	5.17	4.1	7.11	5.2	6.0	4.9

^a Significant difference at alpha ≤ 0.05 level, adjusted for multiple comparisons for DRG 127.

^b Mean and standard deviation reported.

^c Significant difference at alpha ≤ 0.05 level, adjusted for multiple comparisons for DRGs 109 and 89.

DRG category 109 (CABG) had the lowest overall 30-day readmission rate, and the readmission rate was consistently higher for the VA hospital. Patient demographic factors, including, age, race, ethnicity, marital status, discharge destination/setting, did not play a significant role in whether a patient had a readmission within 30 days of discharge for each of the DRG categories. Moreover, there were no significant differences by gender or LOS between the patients who were readmitted to the hospitals and those who were not.

Direct costs

Average direct costs per patient for a readmission were similar at both institutions. Average direct costs were lower at the VA hospital for CABG patients, but were higher for heart failure and pneumonia patients:

DRG 109 (CABG)	VA = \$6,424	UCH = \$10,245
DRG 127 (HF)	VA = \$8,179	UCH = \$4,350
DRG 89 (Pneumonia, > 17 yrs.)	VA = \$7,758	UCH = \$4,712

Survival analysis

Descriptive statistics gave some indications of predictors for unscheduled readmissions. The patterns of patient readmissions, however, were quite complex and often involved multiple admissions and overlapping 30-day readmission periods. Logistic regression analysis of the retrospective data was attempted, but it oversimplified the data. The results were not included in this paper for that reason. To better estimate the risk of readmission given several explanatory variables, and to account for multiple readmissions per patient across the 1-year time frame, survival modeling was more successful. Table 3 summarizes the survival model variables or interaction terms found to be significant in at least one model.

For heart failure, the number of secondary diagnoses was found to be a significant predictor of readmissions within 30 days after initial discharge. With each addition of a secondary diagnosis, the patient was 1.2 times more likely to have a readmission. For CABG, the log of the length of stay ($\log[\text{LOS}]$) was found to be a significant predictor of readmissions within 30 days. A patient was 1.15 times more likely to experience a readmission with each additional increment in LOS.

Number of secondary diagnoses was found to be a significant predictor of 30-day readmissions for pneumonia. The more secondary diagnoses, the more likely a readmission within 30 days; and with each additional secondary diagnosis, the likelihood of a readmission increased 1.2 times. CCS category also proved to be a significant explanatory variable. Patients were 2.3 times more likely to be readmitted within 30 days when they were not discharged with CCS = 122 (Pneumonia, except when caused by tuberculosis or sexually transmitted disease).

Many patients were readmitted multiple times during the study period. When all readmissions were analyzed, some differences in the significant predictors emerged. Facility, $\log(\text{LOS})$, numbers of secondary diagnoses, and CCS category were all significant predictors of readmissions for heart failure patients. VA hospital patients were 1.75 times more likely to have a readmission at any time during the study period than were UCH patients. And for each additional secondary diagnosis, a patient was 1.1 times more likely to be readmitted.

Among CABG patients, facility, CCS category, and number of secondary diagnoses were significant predictive variables of any readmission. CABG patients at the VA hospital were three times more likely to be readmitted than were the same category of patients at UCH. CABG patients were twice as likely

Table 3. Survival model results

Facility			APR-DRG severity			CCS			Number of 2° diagnoses			Log(LOS)			Log(LOS)*Sev			
Est.	S.E.	P-value	Est.	S.E.	P-value	Est.	S.E.	P-value	Est.	S.E.	P-value	Est.	S.E.	P-value	Est.	S.E.	P-value	
All readmissions																		
109	1.1	0.30	0.005	NS		0.7	0.30	0.026	0.3	0.07	0.0003	NS			NS			
127	0.6	0.10	<0.001	NS		NS		NS		0.1	0.02	0.006	0.2	0.07	0.005	NS		
89	0.6	0.13	<0.001	0.6	0.21	0.005	1.1	0.14	<0.001	NS		0.9	0.30	0.005	-0.3	0.11	0.012	
30-day readmissions																		
109	NS		NS			NS			NS			0.9	0.32	0.002	NS			
127	NS		NS			NS			NS		0.1	0.04	0.0004	NS			NS	
89	NS		NS			0.9	0.40	0.0270	0.2	0.05	0.002	NS			NS			

Facility = VA or UCH

CCS = CCS category expressed as a dichotomous variable.

2° Diagnoses = number of secondary diagnoses

LOS = Length of Stay

Est = Estimated parameter

S.E. = Standard error

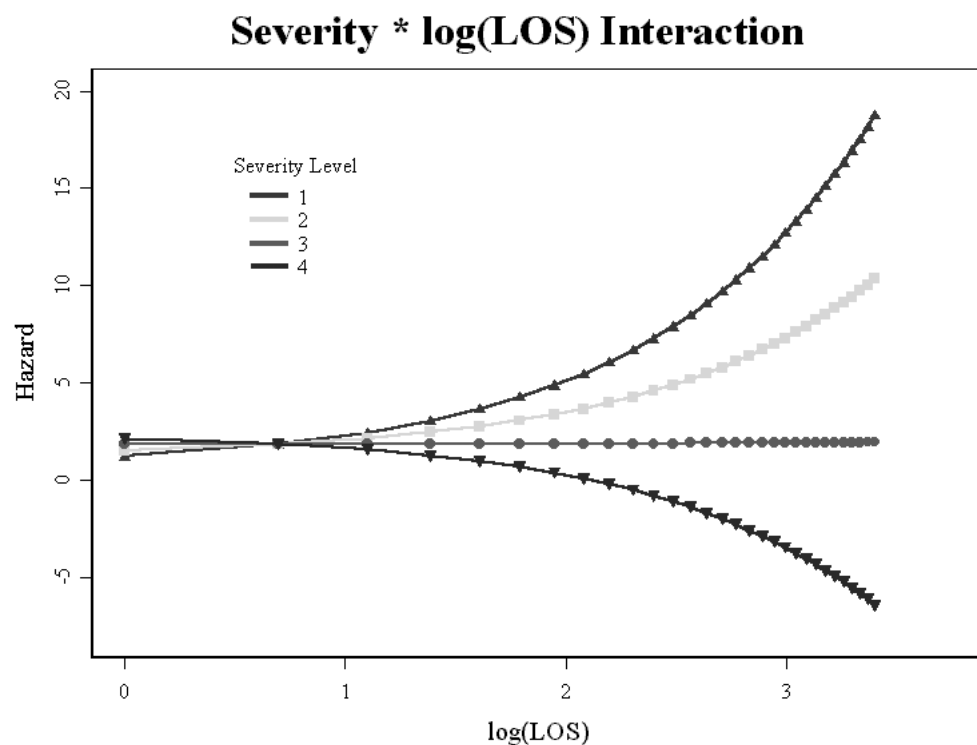
NS = Not significant

Note: Each of these six variables or interaction terms was significant in at least one model. All other variables were not significant in any model.

to have any readmission when they were **not** discharged with CCS = 101 (Coronary atherosclerosis and other heart disease). Furthermore, each additional secondary diagnosis increased the likelihood of any readmission for a CABG patient by 1.3 times.

Pneumonia patients at the VA hospital were 1.8 times more likely to have any readmission, compared with UCH. Additionally, patients were three times more likely to have a readmission when they were not discharged with CCS = 122 (Pneumonia, except when caused by tuberculosis or sexually transmitted disease). The survival model for pneumonia was more complex for any readmission, due to an interaction term. For pneumonia patients, the risk of any readmission was impacted differently by log(LOS) depending on the severity score (Figure 1).

Figure 1. Pneumonia patients' risk of readmission: interaction of severity and log(LOS)



Phase II—expert panel focus group

The qualitative content analysis of the expert panel focus group identified a number of themes centered on communication issues between patient and provider, provider and caregiver, and between different providers. The key themes and issues were—

- Communication and the discharge planning process (e.g., trust, deficits at admission, involving primary care provider [PCP], medications)
- Caregiver behaviors (e.g., problems following treatment plans, inability to be present or retain information at discharge, language barriers)

- Concordant communication behaviors (e.g., facilitating factors such as continuity of care, patient empowerment, patient knowledge of whom to contact, PCP involvement, resources)
- Lack of continuity affecting care during transitions (e.g., medications, patient perceptions of quality, multiple transitions, lack of care coordinator)
- Miscommunication (e.g., between patient and caregiver: misunderstandings, misperceptions of prognosis and need for followup care; between provider and hospital: failure to disclose medication side effects or learn patients' special needs)
- Modes of communication (e.g., improve health care through increased time with patients, changed reimbursement system incentives, improved continuity of care, improved technology)
- Communication vs. competence (e.g., rationalization, fear of blame, barriers to communication, "communication is the glue that holds the broken, complex system together," insensitivity to patient/caregiver communication barriers)

Phase III—patient interviews

Seven female and 18 male patients were interviewed during a 7-month period. Ages ranged from 48 to 87 years old, with an average age of 67. The racial and ethnic composite included 15 whites, 4 blacks, and 3 Hispanics. The majority of the sample members (65 percent) had a primary diagnosis of heart disease, while 9 percent had pneumonia, 13 percent had CABG, and the remaining 13 percent had a mixture of other diagnoses (renal failure, chronic obstructive lung disease, wound infection) upon readmission to the hospitals.

Nine major themes emerged: reasons for readmission, readiness for discharge, patient education and instructions, medication issues, satisfaction with care, family involvement, care coordination and followup, home care management, and cultural and language barriers. A summary of patient comments regarding these themes can be found at

<http://www.patientsafetycenter.com/products.htm> and

<http://floridahealthinfo.hsc.usf.edu/SuncoastCenterMain.htm>.

Discussion

A smooth transition from the hospital to the home is critical to improving posthospitalization patient outcomes. Many studies have examined the transition of patients from the hospital to the home, and have focused on discharge planning or postdischarge interventions in an effort to improve patient outcomes and reduce unscheduled readmissions.^{38–46} The goal of this pilot study was to identify

patient characteristics, organizational factors, and processes that impede “seamless care” and could be targeted for interventions in subsequent studies.

The hospitals involved in this study, while geographically proximal, were thought to have significant differences in their patient characteristics, organizational structures, and processes that might impact readmissions, either positively or negatively. An objective of this pilot study was to determine whether these initial assumptions were indeed correct, what interventions could be developed for the hospitals, and what lessons might be transferrable between the institutions. Our findings indicated that despite some differences, the two hospitals were similar in their patient characteristics and organizational processes, as well as the effects that these factors had on readmissions within 30 days.

Patient characteristics

Some patient characteristics did vary between hospitals, though there were many similarities (Table 1). At both hospitals, few of the studied patient characteristics had an impact on readmissions; those that did varied by DRG category. Age, gender, and race were not predictive of readmission in any of the models. Numbers of secondary diagnoses, log(LOS), and CCS category were most consistently predictive of readmissions. While the decreasing length of hospital stay in the United States has been cited as a potential cause of adverse patient outcomes (including unanticipated readmissions) by some researchers and our expert panel, other studies did not agree.^{1, 15, 16, 49, 50} We found no direct relationship between length of stay and readmission in our study, even though this association affected patient satisfaction and some patients thought it might be a contributing factor in their readmission. The APR-DRG severity of illness score was not significant in five of the six models used in our study, alone or with other covariates. The impact of the severity of illness score on readmissions may have been minimized by the presence of length of stay and secondary diagnosis numbers in the models, as these three variables were significantly correlated for all three DRG categories examined in this study. It is clear from our findings that more complex analyses of patient characteristics are necessary in order to formulate targeted interventions with a likelihood of success. Attributing differences in readmission to increased age, severity of illness, or shorter length of stay was not borne out by our study.

Other factors that are unrelated to health care needs (e.g., living arrangements, race and gender differences) can affect discharge referral decisions. Black patients, persons living with a spouse or caregiver, and women are significantly less likely to receive referrals for skilled home health care assistance.^{51–55} Race and ethnicity are important demographic parameters to monitor for differential patterns of disease and care, but present certain methodological problems.^{56, 57} We found indications of undercoding for race/ethnicity. This can have important policy and procedural implications for tracking seamless care, particularly when combined with language and cultural communication barriers.

Organizational processes and procedures

Common organizational factors and processes

The analyses of the focus group and patient interviews found several overlapping themes centered on communication. The identified themes were cultural and language barriers, patient knowledge of whom to contact, lack of care coordination, lack of primary care physician involvement, inconsistent discharge teaching and medication instructions, lack of patient and caregiver empowerment, and patient quality-of-care perceptions. In addition, the focus group identified multiple transitions and miscommunications at all levels of the health care system, as well as between patient and provider, patient and caregiver, provider and caregiver, and between different providers.

Our findings are largely consistent with the body of literature in transitional care.^{8–14, 23–26, 38–46} Naylor reviewed 94 studies of care received by hospitalized elders during the transition from the hospital to the home,⁹ including the identification of system factors that contributed to poor discharge outcomes. Contributory factors included problems with accessing services, poor communication, inadequate patient and caregiver education, limited continuity of care, inconsistent medical management, and lack of provider accountability. Many studies have used the transitional care model to evaluate postdischarge interventions that included more frequent primary care consultations, psychosocial support, family and caregiver training, and extended home health services with advanced practice nurses.^{8–12, 23, 25, 26} Transitional care attributes include a comprehensive plan of care; the availability of well-trained health care providers to evaluate the complex care needs of patients with acute and chronic illnesses; the sharing of current information across health settings; and addressing the patient's goals, preferences, and clinical status. The plan further includes logistical arrangements, patient and family education, and coordination among health care providers.

Communication issues

Understanding the patient's care transition story is important to our ability to design practical and effective interventions for smoothing the transition from the hospital to the home.^{13, 58} Studies have repeatedly demonstrated the wide gulf between clinicians' perceptions of how medical information is and should be communicated, and the perceptions of patients and of their caregivers.^{59–61}

The importance of incorporating the family and caregiver into the care plan and ascertaining the ability of caregivers to manage patient care, medication regimens, etc., is well known, but not always put into practice.^{13, 59–61} In our study, the importance of incorporating caregivers or family in the discharge planning process was particularly evident with some of the non-English speaking patients, especially if family members were not present at the time of discharge.

Recent studies have suggested the need for increased provider sensitivity with regard to racial, ethnic, and cultural differences in medical decisionmaking, as

well as the patients' desire for information.^{62–69} Lack of information and participation in medical decisionmaking can lead to diminished patient trust in their health care provider and hospital.^{63–69}

Despite differences in the organizational structures and processes at the two hospitals, our preliminary findings did not support those differences as a factor with a strong effect on patient readmissions. One hospital used a centralized case management system, while the other hospital was more decentralized; however, both adhered to discharge planning processes and procedures consistent with Joint Commission on Accreditation of Healthcare Organizations (JCAHO) standards.²⁸ One of the hospitals had an integrated, computerized medical record and pharmacy ordering system, while the other did not. Standardization and computerization of medical records has received attention as a method for improving patient safety and patient outcomes, as such systems have been shown to improve communication between providers.^{11, 21} We found no evidence, however, to indicate that structural differences had a strong effect on patient readmissions.

Inadequate patient and caregiver education

The majority of the readmitted patients that we interviewed indicated that they understood the discharge instructions and medication regimens from their prior admission. It is possible that some of the patients believed they understood the discharge instructions and/or medication regimens, while in reality they did not. Others may have been confused, but were unwilling to admit it.^{13, 63, 64} A minority of patients in our study had significant difficulties communicating with their doctor or other health care providers, which, in some cases, contributed to their readmission.

Demographic factors such as ethnicity, gender, and age influence the patient's hospitalization experience and often are barriers to effective communication of medical interventions and patient education.^{65–71} In our study, cultural barriers to understanding medical interventions included language, lack of knowledge regarding the American biomedical system, lack of knowledge regarding the medical condition and medical terminology, as well as ineffective communication between the patient and provider. These communication barriers hampered some patients in their efforts to obtain adequate information during the transition from the hospital to the home, leaving them dissatisfied with their hospital experience and at risk for unscheduled readmissions.

Limited or inconsistent continuity of care

Our expert panel and interviewed patients at both hospitals agreed that the continuity of care could be inconsistent. Deficits in the continuity of care identified by both groups included a lack of timely followup and a failure to provide good coordination of care following the discharge. There appeared to be an underlying assumption in the discharge planning process that the patient's providers knew what had happened before and during hospitalization, that all the

patient's providers had agreed on a care management plan, and that a provider who knew them would care for them in the transition.

The expert panel and patients had somewhat different perceptions regarding the continuity of care. Many of the patients did not feel prepared to go home and felt that their needs had not been fully met at the time their providers discharged them. Focus group participants indicated that the broad array of providers and variety of health service organizations often lead to fragmentation, rather than a continuum of care. Patients with complex care needs require the services of multiple providers in multiple settings, as part of a coordinated and integrated care process. The expert panel believed that multiple providers often are not aware of current patient care and needs, services provided, prescribed or over-the-counter medications, or patient and family readiness to assume the responsibility of managing care in the home setting. Some patients felt they should have stayed in the hospital until their condition had stabilized and their medication was working and their home health or other support service referrals were in place, and they should have been receiving followup care sooner. Very few patients in our study received referrals for support services and few caregivers were included in the discharge planning process, which sometimes resulted in an inability on the part of the patients to manage their home care. This is consistent with findings that have shown the majority of older adults leave the hospital with unmet needs or are discharged without referrals, despite the need for home care and despite the risk of poor outcomes.^{20, 41–43, 64} These findings and ours suggest a need to improve methods for identifying postdischarge referral needs. Hospitals, for example, could implement policies requiring coordinators to discuss the option of these services with the patient and caregiver well before discharge, so the services can be arranged in a timely manner.

Patient and provider participation in, and satisfaction with, discharge planning have not been well studied. Predictors of patient satisfaction are continuity of care and the patient's readiness to manage at-home care. Interventions aimed at providing continuity of care after discharge²³ often have been expensive and resource intensive, and so they have not been widely implemented. A number of possible practical interventions consistent with the transitional care model—but less expensive than more intensive interventions—might improve continuity of care in the transition. Improved followup (e.g., telephone call within 48–72 hours of discharge, with especially high-risk patients identified by retrospective data analyses) would be a more cost-effective intervention that could potentially reduce unscheduled readmissions. Ensuring that the discharge plan has been coordinated with the patient's primary care provider by identifying one provider (nurse or physician) as transition coordinator also could improve the continuity of care.

Inconsistent medical management and problems accessing needed services

The patient interviews provided valuable insights with regard to current gaps in health services at the time of transition from the hospital to the home. Critical

issues included at-home care management, medications knowledge, and continued access to health care providers. Appropriate referrals to home health care services might increase the ability of patients and caregivers to adhere to the discharge plan, thereby reducing unscheduled readmissions. Home health care services also provide triage and care coordination, thereby enhancing the efficiency of health care services and facilitating improved communication with the patient's physician(s). Obtaining a referral to these services—once the need has been identified—requires coordination between doctors, nurses, and the discharge planner.

Once the discharge has occurred, there is no one in charge of the transition whom the patient can contact in the event additional services are needed. A discharge contact person should be identified in the discharge plan for continuity of postdischarge followup. The discharge plan should clearly state that home health services are an option, in the event they are needed. Furthermore, health care services should be defined in the discharge plan and in conversations between the patient and caregivers, the range of services available in the patient's home area should be discussed, and the patient and caregiver should talk about how to initiate a request for services. Providing this kind of information will help to fill the gaps in health care services once the patient transitions to the home, enhancing continuity of care and improving patient safety.

Confusion regarding medications and medication changes arose as potential risk factors for readmissions, in the expert panel discussion as well as some patient interviews. This confusion is consistent with other studies.^{7, 70–71} In our pilot study, the vast majority of patients returned to their homes following discharge, so comparing preadmission, in-hospital, and postdischarge medication regimens for the community hospital patients was not feasible. Future studies could examine medication changes in greater detail for patients returning home after their discharge.

Lack of provider accountability

There is shared responsibility for health care coordination during hospitalization. After discharge, there often is no one clearly in charge of the transition whom the patient may contact for guidance or to arrange for home health care services. Patients often were instructed to contact their primary care provider for followup care or for answers to questions, whether or not the primary care provider had been involved in the hospital care.

Future directions

This pilot study was designed to be hypothesis generating and had other limitations. The retrospective data were for 1 year only. Just 25 patients agreed to be interviewed. It is not possible to determine if their perceptions were representative of the postdischarge patient population. Only three DRG categories were studied and factors predictive of readmission varied by DRG, so the generalizability of the findings to other diagnoses is problematic. Patient perceptions often were specifically related to the patient's medical condition and

present circumstances, and therefore were not necessarily representative of the larger patient population transitioning from the hospital to the home. Further research is therefore indicated to broaden the study criteria and provide a comparison of these findings with a larger population of patients.

The predictive factors and the patients' perceptions revealed areas in which potential interventions for targeted high-risk patients could be tested for effectiveness. We intend to extend our retrospective data analyses to other DRG categories, using additional years of data, to better enable the identification of patterns in readmission predictive factors. Future studies will add provider perspectives, detailed chart reviews, and additional patient perspectives. Findings from our study have already been used by one institution to implement an action plan for improving communication with non-English speaking patients, and plans are in the works to study that population for improvement.

Conclusions

Despite very different organizational structures and processes within the two hospitals, we found similar patient populations, risk factors, and outcomes. The linkages we found in these different health care facilities between readmissions and health system barriers to smooth and safe transitional care confirm findings in other studies. Patient and organizational factors were found to have contributed to unscheduled readmissions. Targeting high-risk patients, improving communications—including considerations of language and cultural differences—and better coordination of care and followup when transitioning patients from the hospital to the home could potentially prevent some readmissions.

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Author affiliations

College of Public Health, University of South Florida, Tampa, FL (AMS, JW). VISN 8 Patient Safety Center, Tampa, FL (AMS, RRC, CC, PP). Suncoast Center for Patient Safety, Tampa, FL (AMS, RRC, JW). University Community Hospital, Tampa, FL (DS, JLB, BB). Florida Patient Safety Center, Inc. (AMS, RRC). Nova Southeastern Law School, Fort Lauderdale, FL (RRC). Stetson University College of Law, Gulfport, FL (JW).

Address correspondence to: Andrea M. Spehar, D.V.M., M.P.H., J.D.; College of Public Health; University of South Florida; 13201 Bruce B. Downs Blvd.; MDC 56, Annex B; Tampa, FL 33612. Phone: 813-558-3920; e-mail: aspehar@hsc.usf.edu.

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